north and northwestern parts of the State. More than 10,000 Arkansans lost their lives during the war and Civil War cemeteries dot the landscape (Central Arkansas Library System 2006).

3.2.2 Architectural Resources

3.2.2.1 Description

Architectural resources are standing structures that are usually over 50 years of age and of significant historic or aesthetic value. The ROI for this resource analysis is Benton and Washington counties.

3.2.2.2 Affected Environment

Architectural resources in Arkansas include individual structures and groups or districts of related structures such as houses, banks, homesteads, schools, libraries, hotels, and churches. Architectural properties in Arkansas are mostly focused around the lifestyles and cultures of Euro-American settlement, commerce, transportation, education, and government. There are 146 sites in Benton County and 106 sites in Washington County listed on NRHP (NRHP 2006).

3.2.3 Traditional Cultural Properties

3.2.3.1 Description

Traditional cultural properties (TCPs) hold importance to American Indians or other ethnic groups for the continuing practice of traditional culture. Any of these properties may meet the criteria for inclusion in the NRHP and this determination of eligibility (36 CFR parts 800.3–800.13, 2006) is a requirement of Federal and State environmental assessment processes before the initiation of ground disturbance or alteration of a landscape or structure. The ROI for this resource analysis is Benton and Washington counties.

3.2.3.2 Affected Environment

There are 19 federally recognized American Indian tribes that have a historical association with the State of Arkansas. The Trail of Tears, a National Historic Trail, traverses the ROI. However, there are no TCPs within the ROI that are recognized by NRHP (AHPP 2004, Green 2007).

3.3 Water Resources

3.3.1 Surface Water

3.3.1.1 Description

Surface water includes rivers, streams, and lakes, including those designated as impaired. The ROI for this resource analysis includes portions of Benton and Washington counties as described in Section 1.3.

3.3.1.2 Affected Environment

Waterways within the ROI include the Illinois River and its major tributaries in Arkansas: Osage Creek, Flint Creek, and Spring Creek. Most waters in the ROI are suitable for primary contact (i.e., swimmable) and secondary contact (i.e., limited body contact) recreation; propagation of fish and wildlife; fish consumption; and public, industrial, and agricultural water supplies (Arkansas Department of Environmental Quality [ADEQ] 2004).

Every 2 years States must compile as list of waterbodies within their jurisdiction that do not meet the water quality standards established by Section 303(d) of the *Clean Water Act* (33 USC parts 1251 et seq., 2000). These lists, which identify the impairments to each waterbody, are commonly known as *303(d) lists*. Once the list is complete, each jurisdiction must then determine priority rankings for these waters

and establish total maximum daily loads (TMDLs) for each. A TMDL is the maximum amount of pollutants a waterway can receive daily and still meet water quality standards (EPA 2005).

The most recent EPA-approved 303(d) list for Arkansas is that from 2002. Due to revisions in the methodology used to develop 303(d) lists, Arkansas's 2004 303(d) list has not been completely approved by EPA. The 2006 303(d) list has been drafted but is not yet available for public review. This analysis considers impaired waters from both the 2002 and the 2004 303(d) lists.

Impaired waters in the ROI are Clear Creek, Osage Creek, Spring Creek, and Muddy Fork (Table 3.9). ADEQ designated Clear Creek as impaired on the 2002 303(d) list because aquatic life use was not supported at that time due to siltation/turbidity (ADEQ 2002). Silt occurs naturally in waterways, but too much suspended silt causes turbidity (i.e., a cloudiness of the water). Turbidity reduces the amount of light that penetrates the water, which slows down or stops photosynthesis in aquatic plants and, in turn, limits oxygen production. Siltation may be caused by factors such as construction, eroding streambanks, poorly harvested timber, agricultural croplands, and unimproved pastures. In the ROI, siltation is due to agricultural activities and urban runoff (ADEQ 2002).

Table 3.9 Surface water impairments in the ROI.

Waterbody	County	Impairment	Source
Clear Creek	Washington	Siltation/turbidity, pathogens	Agricultural activities, urban runoff
Osage Creek	Benton, Washington	Phosphorus	No source listed[1]
Spring Creek	Benton, Washington	Phosphorus	No source listed[1]
Muddy Fork	Washington	Phosphorus	No source listed[1]

[1]The EPA did not specify a source for this listing.

Table sources: ADEQ 2002, 2004; EPA 2007a

ADEQ includes Clear Creek on the 2004 list as well, but because it does not support primary contact (i.e., swimming) due to pathogens from urban runoff (ADEQ 2004). However, data verification (e.g., additional sampling, biological assessment) is needed to confirm the impairment before a TMDL is scheduled (ADEQ 2004). Pathogen indicators are primarily bacteria, most commonly fecal coliforms and *Escherichia coli* (ADEQ 2004).

EPA has recommended that Osage Creek, Spring Creek, and Muddy Fork be designated as impaired on the 2004 list due to total phosphorus (EPA 2007a). Although nutrients are a necessary component of water ecosystems, excessive amounts stimulate a rapid growth response of aquatic plants, such as algae blooms and aquatic weeds (Klapproth and Johnson 2000, U.S. Geological Survey [USGS] 2006). Algae blooms occur naturally, but with more frequency and severity in the presence of nutrients (NRCS 1994). The algae cause an increase in bacteria and other decomposers that can deplete the dissolved oxygen supply of the waterbody (USGS 2006). Dissolved oxygen is necessary to sustain aquatic life. In addition, the death of large algal populations can create an unpleasant taste and odor to the water. The source of these nutrients in the ROI is not identified; however, excessive nutrients are generally attributed to agricultural fertilizers, urban runoff, and animal waste.

3.3.1.3 Description

Groundwater refers to subsurface hydrologic resources such as aquifers that are used for domestic, agricultural, and industrial purposes. The ROI for this resource analysis includes portions of Benton and Washington counties as described in Section 1.3.

3.3.1.4 Affected Environment

Arkansas ranked fourth in the Nation in groundwater withdrawals in 1995, with groundwater supplying 63 percent of water usage for the State (ANRC 2006). Long-term general trends show that groundwater levels in Arkansas have been consistently dropping across the State, with a few areas rising slightly or remaining constant (ANRC 2006). The karst topography and associated conduit flow of groundwater through the bedrock allow for rapid rates of groundwater recharge in ROI.

The karst topography and associated groundwater flow also make the ROI especially sensitive to groundwater contamination from to local agricultural activities. Poultry and livestock operations located in northwest Arkansas generate a large volume of waste, which is often spread on pasture lands and agricultural fields as fertilizer. Davis, Brahana, and Johnston (2000) conducted a study to monitor groundwater at five sites in northwestern Arkansas between 1995 and 1999. Two of these sites, Braly Spring and Little Wildcat Spring in Washington County, are in the ROI. A third site, Decatur Spring in Benton County, is within 3 miles of the ROI. Results of the study indicate that these springs have been impacted by nitrate loading and the presence of fecal coliform bacteria, particularly after storm pulses (Davis, Brahana, and Johnston 2000).

3.3.2 Wetlands

3.3.2.1 Description

Wetlands are defined by the U.S. Army Corps of Engineers (USACE) as areas that are characterized by a prevalence of vegetation adapted to saturated soil conditions. Wetlands can be associated with surface water or groundwater and are identified based on specific soil, hydrology, and vegetation. The ROI for this resource analysis includes portions of Benton and Washington counties as described in Section 1.3.

3.3.2.2 Affected Environment

The 1987 USACE Wetland Delineation Manual (USACE 1987) provides guidelines to identify and delineate wetlands. For regulatory purposes under the *Clean Water Act*, wetlands are defined as:

> "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." (33 CFR part 328.3, 2006)

At one time, Arkansas held approximately 9.8 million acres of wetland area. As the American frontier began to move west wetlands were diminished throughout the State. By 1937, only 4.9 million acres of wetlands remained. During the 1950s and 1960s, 37 percent of the remaining wetlands were lost due to clearing for agriculture. The current rate of wetland loss has slowed due to conservation incentive programs offered to landowners within the State (Arkansas Multi-Agency Wetland Planning Team [AMAWPT] 2001).

AMAWPT has characterized wetlands within the State using a hydrogeomorphic classification system. Using this system, AMAWPT has determined that there are five types of wetlands that have the potential to occur within the ROI area: depressional, flats, fringe, riverine, and slope wetlands (AMAWPT 2006).

Depressional wetlands are topographic low points that accumulate water from precipitation, groundwater seeps, stream flooding, and runoff. There are seven community types (i.e., plant and animal species adapted to similar environmental conditions) associated with depressional wetlands: floodplain depressions, mountaintop depressions, sinkhole depressions, valley train pond depressions, headwater swamp depressions, sand pond depressions, and unconnected alluvial depressions (AMAWPT 2006).

Flats wetlands are in areas of little or no gradient in which the sole water source is precipitation. There is little to no overland flow into or out of flats wetlands. Seven community types are associated with flats wetlands; alkali post oak flats, hardwood flats, post oak flats, alkali wet prairie flats, pine flats, and wet tallgrass prairie flats (AMAWPT 2006).

Fringe wetlands occur on the margins of lakes more than 2 meters deep. These lakes may be natural or man-made impoundments. There are three community types in the fringe wetland class: connected lake margins, unconnected lake margins, and reservoir shores (AMAWPT 2006).

Riverine wetlands are areas directly flooded by streamflow at least one time every five years. Sources of input may be from overbank flow or backwater flow. There are nine community types related to riverine wetlands: beaver complex wetlands, low-gradient backwater wetlands, mid-gradient backwater wetlands, sand prairie wetlands, wildlife management impoundment wetlands, high-gradient riparian zone wetlands, low-gradient overbank wetlands, mid-gradient floodplain wetlands, and spring run wetlands (AMAWPT 2006).

As the name implies, slope wetlands occur on land surfaces with a sloping gradient. The input source of water for slope wetlands is groundwater discharge or shallow subsurface flows that create a saturated condition. There are five community types in the slope wetland class: bayhead wetlands, non-calcareous perennial seep wetlands, wet weather seep wetlands, calcareous perennial seep wetlands, and sandstone glade wetlands (AMAWPT 2006).

3.3.3 Floodplains

3.3.3.1 Description

In this analysis, floodplains are defined as 100-year floodplains, designated by the Federal Emergency Management Agency (FEMA) as those low-lying areas that are subject to inundation by a 100-year flood (i.e., a flood that has a 1 percent chance of being equaled or exceeded in any given year). The ROI for this resource analysis includes portions of Benton and Washington counties as described in Section 1.3.

3.3.3.2 Affected Environment

In general, a floodplain can be defined as a flat area located adjacent to a stream channel that provides natural storage for water overflow during or after a storm event. EO 11988, *Floodplain Management*, requires that Federal agencies:

> "…take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains…" (42 FR 26951, 1979)

As riparian land may be enrolled under the Arkansas CREP agreement, it is expected that some of the eligible land would be located within floodplains. However, the type of floodplain (e.g., 100-year floodplain) cannot be determined without an exact site location and a FEMA floodplain map. Site specific evaluations would be conducted prior to enrolling a site into CREP to determine if the site is within, or would impact, a 100-year floodplain.

3.4 Soil Resources

3.4.1 Topography

3.4.1.1 Description

Topography is the general configuration of a land surface, including relationships between position and relief of natural and anthropogenic features. For the purposes of this analysis, topography is described by physiographic province. A physiographic province is a region with distinctive geographical features, such as mountain ridges or lowlands. The ROI for this resource analysis includes portions of Benton and Washington counties as described in Section 1.3.

3.4.1.2 Affected Environment

The two major physiographic regions in Arkansas are the Interior Highlands and the Atlantic Plain (National Park Service [NPS] 2000). The Interior Highlands region encompasses the northwest portion of the State and is characterized by broad flat-topped hills and narrow river valleys to the north, and steeply folded ridges and valleys to the south. The Atlantic Plain, which covers the southeast portion of the State, is the flattest of all the physiographic regions.

The ROI lies within the Ozark Plateaus province of the Interior Highlands region (USGS 2003). The predominant topographical features in this province are plateaus that have been dissected to varying extents by fluvial erosion. Elevations range between 200 and 1,900 feet throughout the province, with the most significant changes in local relief occurring in highly dissected areas (Woods et al. 2004).

Karst features, such as caves and sinkholes, are not uncommon in the ROI and are protected by the *Arkansas Cave Resources Protection Act* (Arkansas General Assembly 1989) and the *Federal Cave Resources Protection Act* (16 USC parts 4301 et seq., 1988). Karst features are created by the dissolution of carbonate rocks (e.g., limestone) at or near the land surface. Sinkholes, which can range in size from several feet to hundreds of feet, can collapse and present a significant hazard if this occurs in a developed area. Human activities, such as those that alter natural hydrologic conditions, can trigger sinkhole collapses (Van Dyke 2003).

3.4.2 Soil

3.4.2.1 Description

Generally speaking, soil is the unconsolidated mineral or organic material found on the land surface capable of supporting plant growth. Soils are classified based on the physical and chemical properties of their horizons[2]. For this analysis, soils are described by ecological subregion as defined in Section 3.1.2.2 (Table 3.10, Figure 3.1) (Woods et al. 2004, University of Idaho 2006). The ROI for this resource analysis includes portions of Benton and Washington counties as described in Section 1.3.

3.4.2.2 Affected Environment

Soils in the ROI include alfisols, entisols, mollisols, and ultisols. Alfisols are relatively fertile and tend to be very productive for both agriculture and silviculture. Alfisols are common to every ecoregion within the ROI.

Ultisols also occur in every ecoregion of the ROI. These are strongly leached and acidic soils with relatively low native fertility. Clays accumulate in the subsurface horizon and soils often display a strong yellowish or reddish color resulting from the presence of iron oxides.

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[2] A soil horizon is a layer of soil that can be distinguished from adjacent layers based on characteristics such as texture, color, chemical composition, etc.

Mollisols can be found in the Dissected Springfield Plateau—Elk River Hills and the Lower Boston Mountains. This soil is typical of grassland ecosystems and is characterized by a thick, dark surface horizon. Mollisols are rich in organic materials and thus very productive agriculturally.

Entisols are very diverse and develop in unconsolidated parent material. They usually lack genetic horizons except an A horizon. Entisols are found in the Lower Boston Mountains and the Springfield Plateau.

Table 3.10 Common soils in the subregions of the ROI.

Subregion	County	Order	Common Soil Series
Dissected Springfield Plateau—Elk River Hills	Benton, Washington	Alfisols, Mollisols, Ultisols	Arkana, Clarksville, Estate, Moko, Nixa, Noark, Portia
Lower Boston Mountains	Washington	Alfisols, Entisols, Mollisols, Ultisols	Ceda, Cleora, Enders, Linker, Mountainburg, Nella, Razort, Sidon, Spadra, Steprock
Springfield Plateau	Benton, Washington	Alfisols, Entisols, Ultisols	Captina, Clarksville, Linker, Mountainburg, Nixa, Noark, Razort, Secesh, Tonti
Table source: Woods et al. 2004			

3.5 Air

3.5.1 Description

Although the *Clean Air Act* (42 USC parts 7401 et seq., 1999) is a Federal law, States are generally responsible for implementing the Act. Each State is required by EPA to develop a State Implementation Plan that contains strategies to achieve and maintain National Ambient Air Quality Standards (NAAQS). NAAQS establish limits for six criteria pollutants including ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, lead, and particulate matter (PM). Areas that violate air quality standards are designated as non-attainment areas for the relevant pollutants. Areas that comply with air quality standards are designated as attainment areas for relevant pollutants.

The ROI for this resource analysis includes portions of Benton and Washington counties as described in Section 1.3.

3.5.2 Affected Environment

ADEQ is responsible for ensuring that the air quality within the State meets or is better than that required by Federal and State standards. ADEQ operates an air quality monitoring network capable of measuring various air pollutants throughout the State. Monitoring results demonstrate that Arkansas has relatively good air quality and Federal air quality standards are consistently met (ADEQ 2005).

There is one air quality monitor located in the ROI. It is in the town of Springfield in Washington County and it monitors ozone (EPA 2007b). There are no non-attainment areas in the ROI (EPA 2006c).

Agriculture plays a role in diminishing air quality in Arkansas. Processing emissions, dust from tilling, and smoke from the controlled burning of fields all negatively affects air quality (University of Arkansas 2006). Confined animal operations, such as poultry farms, that can be found throughout the State often

emit ammonia gasses and airborne particulates from manure, feathers, feed, dust, and bacteria that may cause harmful respiratory ailments (University of Arkansas 2006).

3.6 Recreation

3.6.1 Description

Recreational resources are those activities or settings, natural or anthropogenic, designated or available for recreational use by the public. In this analysis, recreational resources include lands and waters used by the public for hunting, fishing, wildlife viewing, hiking, and boating. The ROI for this resource analysis includes portions of Benton and Washington counties as described in Section 1.3.

3.6.2 Affected Environment

Lands that could be enrolled in CREP are privately held; therefore, access to these lands is and would be controlled by the landowners. Public lands available for recreation within the ROI include a national forest and the three wildlife management areas (WMAs) within it, a State park, a national historic trail, a fish hatchery, and three natural areas (Figure 3.2). There is also one national wildlife refuge (NWR), but it is closed to public access (Figure 3.2). There are no State forests or national parks in the ROI.

The Ozark National Forest is comprised of five sections that cover a total of 1.2 million acres in northwestern Arkansas (U.S. Forest Service [FS] 2006). It lies in the center of the ROI and spans parts of both Benton and Washington counties. The Wedington, White Rock, and Ozark National Forest WMAs are located within the boundaries of the Ozark National Forest and at least partially within the ROI. These WMAs are comprised of both federally and privately owned lands that are cooperatively managed by AGFC and FS (AGFC 2006g). In general, WMAs are managed according to specific objectives such as game management, public hunting, waterfowl refuge, wetland development, or migratory bird refuge. All WMAs offer some hunting, fishing, boating, camping, hiking, and wildlife viewing opportunities to the public. Hunting and fishing, regardless of whether the land is public or private, require State-issued licenses and may also require a Federal stamp. A discussion of the economics associated with hunting, fishing, and other recreational activities is provided in Sections 3.7 and 4.7.

The Prairie Grove Battlefield State Park is located in Prairie Grove, southwest of Fayetteville (Arkansas Department of Parks and Tourism 2003). The Trail of Tears National Historic Trail runs south along the eastern border of the ROI and then westward through Washington County (NPS 2006). The C.B. Craig Fish Hatchery is in Benton County near the town of Centerton (AGFC 2006c).

Natural areas are lands specifically managed to preserve or restore natural communities that are now rare (ANHC 2006d). The three natural areas in the ROI are Chesney Prairie, Searles Prairie, and Cave Springs Cave. All are located in Benton County. Chesney Prairie is a 60-acre tallgrass prairie (ANHC 2006d). Searles Prairie is a 10-acre tallgrass prairie located in the town of Rogers (ANHC 2006d). Both are remnants of much larger tallgrass prairies that once occupied Arkansas. Cave Springs Cave, located in the town of Cave Springs, was formed by a groundwater-fed stream. This cave stream hosts the largest known population of Ozark cavefish, it has sheltered gray bat colonies, and is home to many rare plant species including the Ozark trillium (ANHC 2006d).

An NWR is an area managed by FWS that has been designated for the protection of wildlife and wildlife habitat. The Logan Cave NWR is closed to all public use for the protection of the endangered gray bat, endangered cave crayfish, threatened Ozark cavefish, and the fragile cave habitat (FWS 2007b).

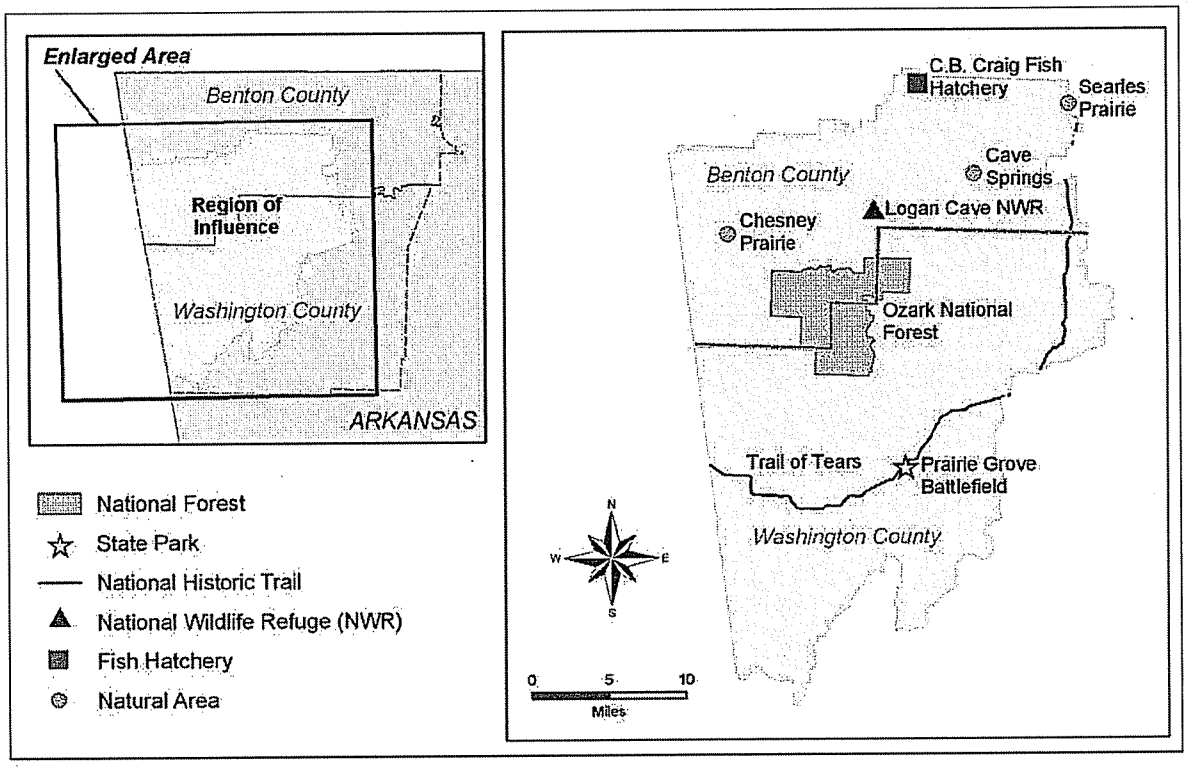

Figure 3.2 Recreation areas within the ROI.

3.7 Traffic and Transportation

3.7.1 Description

Analyses of traffic and transportation can include investigations of traffic flow, routing and scheduling, transportation management, and maintenance. The relevant traffic and transportation issues for this analysis are the maintenance requirements to roads and highway systems within the ROI. The ROI for this resource analysis includes portions of Benton and Washington counties as described in Section 1.3.

3.7.2 Affected Environment

The road and highway system in the ROI includes paved and unpaved roads, highways, and an interstate. There were an estimated 272 miles of roads in riparian areas in the Illinois River watershed in 1999 (FS 1999). These roads may all be impacted to some degree by erosion and sedimentation.

3.8 Socioeconomics

3.8.1 Description

Socioeconomic analyses generally include investigations of population, income, employment, and housing conditions of a specific area. Socioeconomic issues that are significant and considered in detail in this analysis are non-farm and farm employment and income, farm production expenses and returns, agricultural land use, and recreation spending in the ROI. The ROI for this resource analysis is Benton and Washington counties.

3.8.2 Affected Environment

The total population within the ROI was 311,121 people in 2000, which was a 47.5 percent increase from the population of 1990 (USCB 1990, 2000a). Approximately 64.3 percent of the total population was located in urban areas, and 35.7 percent of the population was located within rural areas (USCB 2000a). This was a slight increase in the urban population, which was 60.7 percent in 1990 (USCB 1990).

3.8.2.1.1 Non-Farm Employment and Income

Between 1993 and 2002, the non-farm labor force within the ROI steadily increased from 122,683 in 1993 to 173,458 in 2002 (Bureau of Labor Statistics [BLS] 2006). Non-farm employment during this period ranged from a low of 119,169 positions in 1993 to a high of 168,005 positions in 2002 (BLS 2006). The unemployment rate within the ROI varied from a high of 6.2 percent in 2002 to a low of 4.6 percent in 1995 (BLS 2006). Benton County experienced a 2.6 percent average non-farm unemployment rate for the period, which was only slightly lower than that of Washington County (2.8 percent) (BLS 2006).

Within the ROI, median household income in 1999 was $40,281 in Benton County and $34,691 in Washington County (USCB 2000b).

3.8.2.1.2 Farm Employment and Income

As reported by the *2002 Census of Agriculture* (USDA 2004a), there were 3,166 farm workers on 1,009 of the 5,176 farms within the ROI in 2002, accounting for a payroll of $23.0 million. Table 3.11 lists the hired farm and contract labor costs per county within the ROI and labor costs as a percentage of total production costs. In 1997, the total hired farm and contract labor costs were $25.1 million, which was 3.9 percent of total production costs. In 2002, the total hired farm and contract labor costs were $26.7 million, which was 5.4 percent of total production costs.

Approximately two-thirds of farm cash receipts in Arkansas are from crops, while livestock and livestock products account for the remaining one-third (USDA 2004b). Arkansas ranked second in the U.S. for poultry and eggs and fourth for cotton and cottonseed in 2002 (USDA 2004b). The Bureau of Economic Analysis (BEA) (2006) reported a realized net farm income of more than $82.9 million within the ROI in 2002. This was a decrease of 51.6 percent as compared to the 1992 net farm income. BEA (2006) also reported that total government payments to farms within the ROI were $1.5 million in 2002, a decrease of 54.2 percent from 1992. These decreases contributed to the 54.0 percent reduction in net farm proprietors' income within the ROI from 1992. Farm wages and perquisites (for hired farm labor) in 2002 in the ROI were approximately $23.8 million, which was a 29.5 percent decrease from those in 1992.

Table 3.11 Hired farm and contract labor as a percentage of total production expenses for 1997 and 2002.

Area	2002				1997			
	Hired Farm Labor ($1000)	Contract Labor ($1000)	Total Production Expenses ($1000)	Labor as a Percent of Total Production Expenses	Hired Farm Labor ($1000)[a]	Contract Labor ($1000)[a]	Total Production Expenses ($1000)[a]	Labor as a Percent of Total Production Expenses
Arkansas	253,395	27,758	3,898,297	7.2	259,973	28,141	4,709,755	6.1
Benton	12,583	1,955	260,495	5.6	11,061	1,257	335,834	3.7
Washington	10,446	1,727	234,414	5.2	11,876	878	315,064	4.0

[a]*Value in 2002 dollars*

Table source: USDA 2004a

3.8.2.1.3 Farm Production Expenses and Returns

In 2002, farm production expenses were $495 million within the ROI (USDA 2004a). This was a decrease from the 1992 figure of $651 million (adjusted to 2002 dollars) (USDA 2004a). The average cost per acre within the ROI in 2002 was $735 (USDA 2004a). Average net cash return per farm within the ROI was $36,869 in 2002 (USDA 2004a). The average net cash receipts per acre within the ROI in 2002 were $280 (USDA 2004a). Table 3.12 lists the average farm production expenses and return per dollar of expenditure in 2002 for each county in the ROI. Table 3.13 lists the average value of land and buildings and the average value of machinery and equipment per farm in 2002 within each county in the ROI.

Table 3.12 Average farm production expenses and return per dollar of expenditure in 2002.

Area	Average Size of Farm (acres)	Average Total Farm Production Expense ($)	Average Cost per Acre ($)	Average Net Cash Return per Farm ($)	Average Net Cash Return per Acre ($)	Average Return per $ Expenditure ($)
Arkansas	305	82,114	269	29,158	96	0.36
Benton	132	109,775	832	44,702	339	0.41
Washington	131	83,630	638	29,035	222	0.35
Table source: USDA 2004a						

Table 3.13 Average value of land, buildings, machinery, and equipment per farm in 2002.

Area	Average Size of Farm (acres)	Average Value of Land and Buildings per Farm ($)	Average Value of Machinery and Equipment per Farm ($)
Arkansas	305	447,104	65,299
Benton	132	386,606	46,902
Washington	131	363,663	36,773
Table source: USDA 2004a			

3.8.2.1.4 Agricultural Land Use

In 2002, there were 680,284 acres of land in the ROI in farms including cropland, woodland, pastureland and rangeland, and house lots, etc. (USDA 2004a). This was a 4.0 percent increase from 1997. Table 3.14 provides a list of the acreage for different agricultural land uses in the ROI in 1997 and 2002 and the percent change during that period.

In 1997, there were 188,902 acres in Arkansas enrolled in either CRP or the Wetlands Reserve Program (WRP) (USDA 2004a). Of that amount, 1,944 acres were located within the ROI. Five years later (in 2002), enrollment had decreased statewide to 147,878 acres, with a corresponding decrease in the ROI to 559 acres (USDA 2004a). As of December 2006, a total of 232,572 acres in Arkansas were enrolled in CRP (FSA 2006b). The current average land values in Arkansas are estimated at $1,580 per acre for cropland and $1,740 per acre for pastureland (USDA 2006).

Table 3.14 Agricultural land uses in 1997 and 2002 in the ROI and the percent change during that period.

Land Use	Acres in 1997	Acres in 2002	Percent Change
Cropland[1]	348,341	329,713	-5.3
Woodland[2]	155,053	159,665	3.0
Pastureland and rangeland[3]	117,821	155,906	32.3
House lots, ponds, roads, wasteland, etc.	33,025	35,000	6.0
CRP and WRP[4, 5]	1,944	559	-71.2
Total Land in Farms[6]	654,240	680,284	4.0

[1]Cropland includes all harvested cropland, cropland used for pasture or grazing, and other cropland

[2]Woodland includes wooded pastureland and wooded non-pastureland

[3]Pastureland and rangeland excludes cropland and wooded pastureland

[4]Operations with land enrolled in CRP or WRP are counted as farms if they received $1,000 or more in government payments.

[5]Acreage from Washington County in 2002 withheld to avoid disclosing data for individual farms

[6]Total land in farms includes the sum of cropland, woodland, pastureland and rangeland, and house lots, etc.

Table source: USDA 2004a

3.8.2.1.5 Recreation Spending

According to the *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* (NSFHWAR) (FWS and USCB 2001), approximately 960000 individuals over the age of 16 participated in fishing and hunting related activities in Arkansas in 2001. In the same year, roughly 841,000 individuals participated in some sort of wildlife viewing (e.g. observing, photographing, or feeding wildlife).

Arkansas waterways attracted 782,000 anglers to the State in 2001 for fishing-related activities. Of these anglers, 539,000 were residents of the State and 243,000 were non-residents. According to NSFHWAR, total fishing-related expenditures in 2001 were in the range of $446 million from resident and non-resident anglers. Of this amount, approximately $184 million was spent on trip-related expenditures, such as lodging, food, and transportation; while $208 million went to equipment expenditures, such as rods, reels, and fishing line. The remaining $54 million went to other related costs, such as permits, licenses, and membership dues. The 2001 survey data indicate that the number of anglers living in and entering the State for fishing activities increased from 1996 by roughly 18,000 individuals. Responses to the 2001 survey indicated that the most popular species among anglers were catfish, crappie, and black bass (FWS and USCB 2001).

Arkansas resident and non-resident hunters totaled 431,000 according to the 2001 survey. Residents accounted for 303,000 of those individuals; with non-residents accounting for 128,000 individuals. Hunting-related expenditures contributed revenue of about $517 million dollars to the State. Of this amount, trip-related expenditures amounted to $207 million, while equipment-related expenses totaled $157 million. Other related hunting expenses added $153 million of the total revenue. Comparison of the 1996 survey to the 2001 survey shows an increase of 52,000 hunters within or entering the State. Responses to the 2001 survey suggest that there is a preference for hunting big game species. Survey results show that around 322,000 hunters preferred hunting big game, 145,000 hunted small game, and 171 thousand hunted migratory birds (some individuals hunted in more than one category) (FWS and USCB 2001).

Wildlife-viewing activities in Arkansas were enjoyed by roughly 841,000 individuals in 2001. These activities produced revenue of $244 million dollars for the State that year. Trip-related expenses, such as transportation, food, and lodging, amounted to $20 million; while equipment related expenses, such as

film, binoculars, and cameras, added up to $205 million. Donations, contributions, memberships, and other related expenses contributed the remaining $19 million (FWS and USCB 2001).

3.9 Environmental Justice

3.9.1 Description

Populations of special concern are identified and analyzed for environmental justice impacts. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires that Federal agencies:

> "...make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations...." (59 FR 32, 1995)

Race and ethnicity are two distinct categories of minority populations. A minority population can be described by either category, or by a combination of the two. Race as defined by USCB includes White, Black or African American, American Indian or Alaskan Native, Asian, and Native Hawaiian or Other Pacific Islander (USCB 2001). Ethnicity is defined as either being of Hispanic or Latino origin and any race, or not of Hispanic or Latino origin and any race (USCB 2001). Hispanic or Latino origin is further defined as "a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race" (USCB 2001). A minority population can be described as being composed of a minority group and exceeding 50 percent of the population in an area, or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population (CEQ 1997a).

National poverty thresholds are measured in terms of household income and are dependent upon the number of persons within the household. Individuals falling below the poverty threshold are considered low-income individuals. USCB census tracts where at least 20 percent of the residents are considered poor are known as *poverty areas*. When the percentage of residents considered poor is greater than 40 percent, the census tract is considered an *extreme poverty area* (USCB 1995).

The ROI for this resource analysis is Benton and Washington counties.

3.9.2 Affected Environment

As reported by USCB for year 2000 (2000a), demographics for the ROI population were 89.4 percent White, 1.3 percent Black or African American, 1.5 percent American Indian or Alaska Native, 1.3 percent Asian, 0.3 percent Native Hawaiian or Pacific Islander, and 6.2 percent all other races or combination of races. Hispanic or Latino of any race accounted for approximately 8.5 percent of the population. The ROI is not a location of a concentrated minority population.

The average poverty rate for the ROI in 1999 was 12.35 percent, with Benton County at 10.1 percent and Washington County at 14.6 percent (USCB 2000b). The ROI would not be considered a poverty area because less than 20 percent of the residents overall are considered poor.

There were 329 minority-operated farms in the ROI in 2002, accounting for 11.1 percent of all minority-operated farms within Arkansas. Within the ROI, 136 farms were operated by Indians or Alaskan Natives; 1 by Blacks or African Americans; 13 by Asians; 4 by Native Hawaiians or Pacific Islanders; 98 by persons of Spanish, Hispanic, or Latino origin; and 77 by persons reporting more than one race (USDA 2004a). These farms comprised 6.4 percent of the total number of farms within the ROI (USDA 2004a).

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter discloses the potential environmental consequences or impacts to resources described in Chapter 3 that may result from implementing the preferred alternative or no action alternative. As this analysis is programmatic and not site specific, resource impacts may not always be quantifiable. In compliance with guidelines contained in NEPA and CEQ regulations, each individual CREP agreement would require a site specific environmental evaluation to be completed by FSA.

4.1 Biological Resources

4.1.1 Wildlife and Fisheries

4.1.1.1 Level of Impact

Significant impacts to wildlife and fisheries would include those actions that resulted in harming, harassing, or reducing those populations to the point they become imperiled or populations of concern, or reducing or adversely altering their habitat.

4.1.1.2 Alternative A—Preferred

Implementation of preferred alternative would result in long-term, beneficial impacts to both wildlife and fisheries in and around the ROI. Agricultural practices, both current and historical, have limited some species within the ROI and displaced others from their habitat. Removing portions of land from agricultural production and implementing the proposed CPs would increase the quality and abundance of wildlife and fisheries habitat.

4.1.1.2.1 Wildlife

Implementation of riparian buffers (CP22) and marginal pastureland wildlife habitat buffers (CP29) would restore and enhance riparian vegetation. The grasses, shrubs, and trees would benefit wildlife species such as white-tailed deer, wild turkey, and numerous small mammals by creating nesting, foraging, and protective cover areas. These areas would provide travel corridors for the daily and seasonal migration of many wildlife species.

Migratory birds often use riparian buffers for breeding, wintering, and feeding areas, and thus would also benefit from CP implementation (Anderson and Masters 2004). There would be an additional benefit to terrestrial and avian wildlife species if riparian buffers and hardwood tree plantings are attached to existing forest vegetation, such as shelterbelts and windbreaks, so that habitat is maximized and habitat fragmentation is reduced. This would benefit all wildlife species within the ROI.

Grassland nesting bird species have declined significantly with the loss and degradation of grassland habitat. The encroachment of woody vegetation on grasslands results in a higher incidence of predation and brood parasitism on grassland nesting species. Research indicates that predation and brood parasitism on grassland nesting species can be reduced by increasing the distance between grassland habitat and forest edge. One study reported that nests located less than 60 meters from forest edge were less successful than those located more than 60 meters from the edge (Burger; Burger, Jr.; and Faaborg 1994). Other studies found that increased predation occurred at less than 50 meters from the forest edge (Winter, Johnson, and Faaborg 2000; Gates and Gysel 1978). Therefore, if grassland nesting species are of concern to landowners participating in CREP, woody vegetation such as that common to riparian buffers or hardwood tree planting areas should not be planted directly adjacent to areas of current grassland or areas to which large tracts of native and introduced grasses and legumes are to be established.

4.1.1.2.2 Fisheries

Implementation of the proposed CPs would restore and enhance aquatic habitat and improve overall water quality. Establishing riparian buffers and upland marginal pastureland wildlife habitat buffers would stabilize loose soils and cover areas of bare ground, reducing the amount of sediments entering waterways. Restricting livestock access to floodplains would also reduce sediment input due to streambank erosion. High sediment levels in waterways can interfere with the hatch of aquatic insects, which is a major component of the aquatic food chain. Reducing sedimentation in waterways would also decrease the turbidity of the water. Lowering turbidity may lower water temperatures, allowing the water to hold more dissolved oxygen.

Establishing riparian and upland vegetation would reduce the amount of nutrients and pollutants entering water sources. Reducing nutrients would limit the excessive growth of aquatic plants. Excessive and rapid growth of aquatic plants in areas of high nutrient loading causes a decline in dissolved oxygen content within the water. Restricting livestock access to floodplains would reduce the amount of fecal coliform and other bacteria entering water sources.

Once mature, riparian buffers would create an overstory canopy and provide shade to waterways. Shade would allow the water to stay cooler, which would increase the ability of the water to hold dissolved oxygen. Eventually, downed and decaying trees from the buffers would provide detritus such as limbs, leaves, fruit, and insects from overhanging and submerged vegetation. Detritus can contribute as much as 75 percent of the organic food base in small streams (Welsh 1991). Submerged and downed vegetation would eventually create pools, riffles, and gravel beds for spawning areas.

4.1.1.3 Alternative B—No Action

Under the no action alternative, lands eligible for CREP enrollment would remain in agricultural production. Wildlife and fisheries habitat could continue to decline in quality and become more fragmented, and impaired waterways within the ROI would be likely to remain as such. Terrestrial, avian, and aquatic species would most likely continue to be exposed to poor water quality.

4.1.2 Vegetation

4.1.2.1 Level of Impact

Significant impacts to vegetation would include those actions that resulted in removing or choking out unique or imperiled vegetation, or introducing vegetation that is invasive.

4.1.2.2 Alternative A—Preferred

Implementation of the proposed CPs would result in a beneficial impact to vegetation resources within the ROI. Historic vegetation has been altered due to practices such as clearing for agricultural fields and restricting natural fire regimes. The CPs would enhance existing vegetation and establish grasses, legumes, forbs, shrubs, and trees in riparian areas and marginal pasturelands.

4.1.2.3 Alternative B—No Action

Under the no action alternative, the proposed CPs would not be implemented and native vegetation would continue to be removed for agricultural purposes.

4.1.3 Protected Species and Habitat

4.1.3.1 Level of Impact

Significant impacts to protected species and habitat would include any action that resulted in the harassment or loss of threatened, endangered, or candidate species or their defined habitat.

4.1.3.2 Alternative A—Preferred

Implementation of the proposed CPs would result in beneficial impacts to eight of the ten federally listed and candidate species that occur within the ROI (Table 4.1). There is potential for the Missouri bladderpod to be negatively impacted; however, this impact can be mitigated. Florida panthers will not be affected at all as they are no longer found in the State.

Table 4.1 Impact of preferred alternative on federally listed and candidate species within the ROI.

Species	State Status[1]	Federal Status[1]	Impact
Bat, gray	S2	E	+
Bat, Indiana	S1	E	+
Bat, Ozark big-eared	S1	E	+
Bladderpod, Missouri	S1	E	-/0
Cavefish, Ozark	S1	E	+
Crayfish, cave (*Cambarus aculabrum*)	S1	E	+
Darter, Arkansas	S1	C	+
Eagle, bald	S1	T	+
Mucket, Neosho	S1	C	+
Panther, Florida	---	E	0

Status Codes: E = Endangered, T = Threatened, C = Candidate, S1 = extremely rare and vulnerable to extirpation, S2 = very rare and susceptible to extirpation.

Impact Codes: + = positive impact, - = negative impact, 0 = no or negligible impact.

Establishment of riparian buffers would benefit the gray bat, Indiana bat, Ozark big-eared bat, and bald eagle by creating habitat for breeding, foraging, and nesting. These bats use riparian areas for foraging habitat, where they fly between trees while catching insects. These bats feed around mature trees that overhang waterways for protection from predation. The bald eagle is often considered a riparian dependant species that forages on waterfowl, fish, and small game. Bald eagles use large trees in riparian areas for nesting and perching areas.

The Ozark cavefish, Arkansas darter, cave crayfish, and Neosho mucket would benefit from improved water quality and increased habitat. Ozark cavefish are dependant on good water quality. Decreasing the overland flow of pollutants into waterways would improve water quality within and downstream of the ROI. Because Ozark cavefish rely on nutrients from gray bat guano, the benefit of CP implementation to gray bats would in turn benefit the Ozark cavefish. Arkansas darters require cool water temperatures and good water quality. Implementation of riparian buffers would increase the amount of shade over waterways, allowing for cooler water temperatures. Because the biggest limiting factor to cave crayfish populations is poor water quality, the improvements to water quality provided by implementation of the proposed CPs would significantly benefit this species. Reduced sedimentation and improved water quality would also benefit the Neosho mucket.

In general, riparian buffers would reduce the amount of sediment, nutrients, and other pollutants entering water sources, allowing for better water quality. The aquatic species within the ROI rely on low levels of turbidity, cooler water temperatures, and overall good water quality.

Missouri bladderpods can sometimes be found in pastures where frequent mowing and grazing have kept the areas open. Disruption of areas that contain Missouri bladderpods may have a negative impact to this species. Care should be taken to ensure that areas containing populations of Missouri bladderpod

are not enrolled into marginal pastureland wildlife habitat buffers. With this mitigation, there would be no impact to the Missouri bladderpod.

All listed species may be temporarily negatively impacted during CP implementation due to construction activities and increased sedimentation. To ensure these temporary impacts are negligible, implementation activities should be scheduled to avoid breeding and nesting periods of protected species. The net impact of the proposed action on protected species within the ROI would be beneficial.

4.1.3.3 Alternative B—No Action

Under the no action alternative, the degradation of vegetation, wildlife habitat, and aquatic habitat would continue. Habitat would decline in quality and become more fragmented, and impaired waterways within the ROI would be likely to remain as such. Protected species would continue to be exposed to poor water quality.

4.2 Cultural Resources

4.2.1 Archaeological Resources

4.2.1.1 Level of Impact

Significant impacts to archaeological resources would include those actions which resulted in: 1) directly or indirectly altering the characteristics of the property that qualify it as a historic cultural resource; 2) causing destruction or damage to the property; 3) removing parts or all of the property from its historic location; 4) introducing any permanent atmospheric, audible, or visual elements that diminish the integrity of the historic property; 5) the neglect of a registered property; or 6) the disturbance of important religious sites or sites of cultural significance to American Indians or others.

4.2.1.2 Alternative A—Preferred

There is the potential that archaeological resources could be encountered during implementation of the preferred alternative. Activities that require any excavation to accomplish tasks associated with CP installation may impact recorded and unidentified archaeological resources.

As the Arkansas CREP agreement does not address specific sites and Federal law precludes the release of specific locational information of archaeological sites, detailed cultural resources information is not offered in this analysis (16 USC part 470, 2000). All actions would be reviewed with ASHPO during the planning and implementation phases of the proposed action. When specific areas that are to be enrolled in CREP are identified by legal description, a Class I literature search, as appropriate, would be conducted on these properties to determine if further investigation or mitigation would be warranted.

4.2.1.3 Alternative B—No Action

Under the no action alternative, agricultural practices that occur on lands within the ROI would continue. Though the continuation of farming and other agricultural practices on previously disturbed land would not be expected to impact archaeological resources, any change in these activities that would disturb previously intact areas may result in impacts to known or unidentified properties.

4.2.2 Architectural Resources

4.2.2.1 Level of Impact

Significant impacts to architectural resources would include those actions which resulted in: 1) directly or indirectly altering the characteristics of the property that qualify it as a historic cultural resource; 2) causing destruction or damage to the property; 3) removing parts or all of the property from its historic location; 4) introducing any permanent atmospheric, audible, or visual elements that diminish the

integrity of the historic property; 5) the neglect of a registered property; or 6) the disturbance of important religious sites or sites of cultural significance to American Indians or others.

4.2.2.2 Alternative A—Preferred

There is the potential that architectural properties would be encountered during implementation of the preferred alternative. Activities associated with CP installation may impact recorded and unidentified architectural resources.

As the Arkansas CREP agreement does not address specific sites, detailed cultural resources information is not offered in this analysis. All actions would be reviewed with ASHPO during the planning and implementation phases of the proposed action. When specific areas that are to be enrolled in CREP are identified by legal description, a Class I literature search, as appropriate, would be conducted on these properties to determine if further investigation or mitigation would be warranted.

4.2.2.3 Alternative B—No Action

Under the no action alternative, agricultural practices that occur on lands within the ROI would continue. Though the continuation of farming and other agricultural practices on previously disturbed land would not be expected to impact architectural resources, any change in these activities that would disturb previously intact areas may result in impacts to known or unidentified architectural properties.

4.2.3 Traditional Cultural Properties

4.2.3.1 Level of Impact

Significant impacts to TCPs would include those actions which resulted in: 1) directly or indirectly altering the characteristics of the property that qualify it as a historic cultural resource; 2) causing destruction or damage to the property; 3) removing parts or all of the property from its historic location; 4) introducing any permanent atmospheric, audible, or visual elements that diminish the integrity of the historic property; 5) the neglect of a registered property; or 6) the disturbance of important religious sites or sites of cultural significance to American Indians or others.

4.2.3.2 Alternative A—Preferred

There is the potential that TCPs could be encountered during implementation of the preferred alternative. Activities to accomplish tasks associated with CP installation may impact eligible and unidentified TCPs.

As the Arkansas CREP agreement does not address specific sites, detailed cultural resources information is not offered in this analysis. All actions would be reviewed with ASHPO during the planning and implementation phases of the proposed action. When the specific areas that are to be enrolled in CREP are identified by legal description, a Class I literature search, as appropriate, would be conducted on these properties to determine if further investigation or mitigation would be warranted.

4.2.3.3 Alternative B—No Action

Under the no action alternative, agricultural practices that occur on lands within the ROI would continue. Though the continuation of farming and other agricultural practices on previously disturbed land would not be expected to impact TCPs, any change in these activities that would disturb previously intact areas may result in impacts to known or unidentified properties.

4.3 Water Resources

4.3.1 Surface Water

4.3.1.1 Level of Impact

Significant impacts to surface water would include those actions that permanently increase runoff or pollutants entering rivers, streams, or lakes; adversely change water supply or storage; or cause violations of State or Federal laws or regulations.

4.3.1.2 Alternative A—Preferred

Implementation of the preferred alternative would have long-term beneficial impacts on surface water quality throughout and downstream of the ROI. The proposed CPs would establish vegetation on marginal pastureland areas and riparian areas. These buffers would stabilize soils and reduce soil erosion. Doing this would result in less sediment entering surface waters.

Riparian buffers would reduce the amount of nutrients, including phosphorus, entering waterways. Excess phosphorus is the most common impairment of waterways within the ROI. Establishing vegetation would also reduce the amount of herbicides and other pollutants entering surface waters by decreasing the velocity of overland flow. Decreasing the velocity of flow allows soluble pollutants to be taken up by vegetation before they run into waterways.

Restricting livestock access to floodplains would benefit water quality by reducing both pathogen and sediment input. In addition, CREP implementation is expected to cause a decrease in agricultural acreage that would result in reduced runoff from agricultural herbicides, nutrients, and other pollutants.

Installation of CPs may involve the clearing of vegetation and some soil disturbance. These activities may result in high levels of sediment runoff, resulting in temporary adverse impacts to surface water quality. The use of silt fencing or similar mitigation practices would reduce these impacts (EPA 2006d).

4.3.1.3 Alternative B—No Action

Under the no action alternative, the quality of surface water in the ROI would continue to be degraded from sources including agricultural production. Waterways would continue to exhibit high levels of pathogens, sediments, and phosphorus.

4.3.2 Groundwater

4.3.2.1 Level of Impact

Significant impacts to groundwater would include those actions that permanently increase pollutants entering groundwater; adversely change water supply or storage; or cause violations of State or Federal laws or regulations.

4.3.2.2 Alternative A—Preferred

Implementation of the preferred alternative would result in positive effects on groundwater quality within and around the ROI. The proposed CPs would have a positive impact to surface water quality, which would also help improve the quality of groundwater that is recharged by surface water. Establishing permanent vegetation in riparian areas and on marginal pasturelands would slow the rate of overland flow, allowing for great rates of aquifer recharge. Reducing livestock access to floodplains would result in less fecal coliform and other bacteria from entering surface water; translating to less of these pollutants entering groundwater. Furthermore, reducing agricultural acreage would decrease the amount of related pollutants leaching into groundwater.

4.3.2.3 Alternative B—No Action

Under the no action alternative, groundwater resources in the ROI would continue to be subject many of the same impairments as those of surface waters including high levels of phosphorus. Rates of groundwater recharge may decrease over time if vegetation is removed due to expanding agricultural practices.

4.3.3 Wetlands

4.3.3.1 Level of Impact

Significant impacts to wetlands would include those actions that permanently diminish or degrade wetland resources.

4.3.3.2 Alternative A—Preferred

Implementation of the preferred alternative would have a beneficial impact to wetlands within the ROI. Wetlands may receive water from groundwater, rain, water runoff, streams, rivers, and lakes. Therefore, improving the quality of groundwater and surface water would also improve water quality within wetlands. In addition, establishing vegetation in riparian areas and marginal pasturelands would reduce the amount of sediments and pollutants entering water sources that contribute to wetland recharge in the ROI.

The removal of some land from agricultural use may affect the number and size of artificial wetlands formed by anthropogenic features associated with agricultural activities such as reservoirs and drainage channels; however, this effect is expected to be minor.

4.3.3.3 Alternative B—No Action

Under the no action alternative, wetlands in the ROI would continue to be subject to high levels of sediments and pollutants.

4.3.4 Floodplains

4.3.4.1 Level of Impact

Significant impacts to floodplains would include those actions that cause destruction to or reduce the function of floodplains.

4.3.4.2 Alternative A—Preferred

The preferred alternative would have a beneficial effect to floodplains. Establishing vegetation would help decrease stream bank erosion and improve overall function of the floodplains. Restricting livestock access to floodplains would reduce streambank destabilization and the amount of exposed soil, which would decrease erosion and sediment buildup on floodplains. The proposed CPs are not expected to adversely alter the drainage, flow, or holding capacity of floodplains.

4.3.4.3 Alternative B—No Action

Under the no action alternative, the present rates of stream bank erosion and the resulting overland flow of sediments would remain unchanged.

4.4 Soil Resources

4.4.1 Level of Impact

Significant impacts to earth resources would include those actions that erode or diminish unique topographical features or soil types, or permanently increase erosion and sedimentation.

4.4.2 Alternative A—Preferred

Long-term beneficial impacts to topography and soils are expected to occur under Alternative A. Implementation of the proposed CPs would result in localized stabilization of soils and topography as a result of decreased erosion and runoff. Establishing permanent vegetation on former croplands would reduce erosion by wind and water. Reducing livestock access to floodplains would also reduce erosion and stream bank destabilization.

Short-term disturbances to soils during implementation of CPs may include tilling or excavation, resulting in temporary increases in soil erosion. The use of silt fencing, filter fabric, or similar measures would reduce these impacts.

4.4.3 Alternative B—No Action

Under the no action alternative, the current rates of erosion and the changes in topography resulting from erosion would continue.

4.5 Air

4.5.1 Level of Impact

Significant impacts to air quality would include those actions that: 1) cause or contribute to a violation of any national, State, or local ambient air quality standard; 2) expose sensitive receptors (e.g., residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, parks, and outdoor restaurants) to substantially increase pollutant concentrations; or 3) cause emissions which exceed any significant criteria established by the State Implementation Plan.

4.5.2 Alternative A—Preferred

Implementation of the preferred alternative would provide a slight benefit to local air quality over time. The establishment of vegetation in riparian areas and marginal pasturelands would minimize the amount of exposed soil, resulting in a beneficial impact to local air quality. Vegetation may help reduce dust and bacteria emissions from some confined animal operations. Reducing the amount of lands used for agricultural practices would also reduce annual activities such as field burning and tilling, which cause air pollution.

Implementation the proposed CPs may include activities such as tilling, burning, and installation of various structures. These activities may temporarily impact local air quality. Tilling may temporarily increase particulate matter in the immediate area. This can be mitigated by watering exposed soil before and after work. Despite the temporary increase in particulate matter, effects to air quality due to implementation of the proposed CPs would not be significant nor long term.

Installing various structures such as roads, firebreaks, and fences may require the temporary use of heavy-duty diesel construction vehicles. Primary emissions from construction vehicles include carbon monoxide and some particulate matter. Best management practices (BMPs) would be used during construction activities to reduce the amount of emissions.

Prescribed open burning would release pollutants into the environment such as particulates, partially consumed fuel, liquid droplets, carbon monoxide, hydrocarbons, and nitrogen oxides. The quantity and distribution of these pollutants would depend on the type of vegetation that is being burned, the configuration of the burned material (material heaped or organized in rows), and the weather at the time of burning. Moderate prescribed burning would not likely have a significant impact to local air quality.

4.5.3 Alternative B—No Action

Under the no action alternative, existing air quality conditions would not change.

4.6 Recreation

4.6.1 Level of Impact

Significant impacts to recreational resources would include those actions that drastically change the quantity of lands used for public recreation, or that degrade any aspect of these lands such as aesthetics, fisheries, wildlife, or water quality.

4.6.2 Alternative A—Preferred

Implementing the preferred action would result in a long-term beneficial impact to recreation resources within the ROI. The proposed CPs would improve water quality, which would support more abundant and healthier fish populations in the ROI. This would result in increased fishing opportunities. Creating or enhancing quality wildlife habitat would increase the abundance of species frequenting the ROI and provide more successful opportunities for hunting and wildlife viewing.

The growth in hunting, wildlife viewing, and fishing opportunities may increase monies received from the purchase of licenses and from other recreational spending, potentially improving socioeconomic conditions in the area (see Section 4.7, *Socioeconomics*). Implementation of the proposed CPs would increase the desirability of land to be used for non-consumptive outdoor activities such as swimming, boating, and camping due to improved aesthetics.

Construction activities associated with CP implementation may temporarily displace some wildlife species. These activities may also temporarily increase sedimentation entering waterways, which would have an adverse impact to some fish species and water-related recreation. The adverse impacts associated with construction activities would be temporary and minimized using BMPs.

4.6.3 Alternative B—No Action

Under the no action alternative, the current condition of water and lands used by the public for recreation would remain unchanged.

4.7 Traffic and Transportation

4.7.1 Level of Impact

Significant impacts to traffic and transportation resources would include those actions that drastically alter maintenance requirements to roads and highway systems.

4.7.2 Alternative A—Preferred

Highway and road system maintenance expenditures typically include costs associated with erosion and sedimentation. The proposed CPs would result in reduced erosion and sedimentation due to slower stream velocities and decreased overland flow. Therefore, the preferred action would have a slight beneficial impact to existing traffic and transportation conditions.

4.7.3 Alternative B—No Action

Under the no action alternative, the current maintenance requirements to roads and highway systems due to erosion and sedimentation resulting from agricultural activities in the ROI would remain unchanged.

4.8 Socioeconomics

4.8.1 Level of Impact

Significant impacts to socioeconomics would include those activities which may induce changes in population density, growth rate, or patterns of land use.

4.8.2 Alternative A—Preferred

Implementation of the preferred alternative would result in a maximum of 15,000 acres of land being conserved for a period of 15 years. This would result in a positive net present value for the land rentals.

This action would result in a maximum loss of 15,000 acres of agricultural land. In 2002, there were 3,166 farm workers on the 680,284 acres of farms within the ROI, accounting for a payroll of $23.0 million (USDA 2004a). Removing 15,000 acres from agricultural production would decrease the land in farms to 665,284 acres and may result in the loss of 69.8 farm worker positions at an estimated cost of $507,075 per year when all 15,000 acres are under contract. The loss of these positions would account for approximately 2 percent of the farm worker positions available in 2002. The loss of production on 15,000 acres would reduce the amount of total farm production expenditures, less hired and contract labor, by $10.3 million per year, or approximately 2 percent of the total 2002 farm production expenditures (USDA 2004a).

Based on established county pastureland rates in Arkansas, CREP enrollment is estimated at an average of $36 per acre for the 15,000 acres proposed. In addition, participants would receive an annual maintenance fee of $9/acre. FSA would provide one time SIP of $100 per acre and would cost share with producers for 50 percent of the eligible reimbursable costs. The State would also provide a one time incentive of $200/acre. The total net present value is $3.4 million over 15 years (Appendix D).

Hines, Sommer, and Petrulis (1991) noted that enrolling lands into CRP negatively affected agricultural-based industries such as transportation and processing. The replacement of expenditures that would have supported local agriculture-related industries with CRP payments is often spent on other commodities within the local community. Impacts are generally greater where agriculture is the dominant economic activity and CRP enrollment is high.

Feather, Hellerstein, and Hansen (1999) reported non-market benefits associated with the implementation of CRP. For annual consumer surplus in Arkansas, these would include an estimated $1.33 per acre for wildlife viewing and $2.93 per acre for freshwater recreation activities for a total consumer surplus per acre from CRP of $4.26. Total annual consumer surplus attributable to CRP for the U.S. equated to $13.45 or about three times that of the consumer surplus generated by CRP activities in the South Eastern Region, which includes Arkansas. It is expected that the proposed CPs would improve wildlife and fisheries habitat, which in turn may improve hunting, fishing, and wildlife viewing opportunities in the ROI. These increased opportunities may generate recreation-related economic activity within and around the ROI.

4.8.3 Alternative B—No Action

Under the no action alternative, CREP would not be implemented and socioeconomic conditions would continue to follow the trends associated with the ROI, Arkansas, and South Eastern Region of the U.S.

4.9 Environmental Justice

4.9.1 Level of Impact

Significant impacts to environmental justice would include those activities in which low income or minority populations are adversely affected or unfairly compensated, or all affected individuals are not allowed equal access to the decision making process.

4.9.1.1 Alternative A—Preferred

This analysis demonstrates that the ROI is neither an area of concentrated minority population, nor a poverty area. Therefore, there would be no impacts to environmental justice as a result of the proposed action.

4.9.1.2 Alternative B—No Action

There would be no impacts to minority populations or low-income populations under the no action alternative.

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5.0 CUMULATIVE EFFECTS

5.1 Introduction

As defined by CEQ regulations:

> "Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency ('Federal or non-Federal') or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR part 1508.7, 2006)

CEQ guidance suggests that the first steps in assessing cumulative impacts involve defining the scope of the proposed action and other actions, and evaluating the nature of potential interactions between the actions (CEQ 1997b). Scope must consider geographic and temporal relationships between the proposed action and other actions. Actions overlapping with or in proximity to the proposed action would be expected to have more potential for a relationship than those more geographically separated. Similarly, actions that coincide even partially in time would tend to offer a higher potential for cumulative effects.

For the purpose of this analysis, the ROI is that portion of the Illinois River Watershed proposed for CREP enrollment and described in Section 1.3. The primary sources of information used to identify reasonably foreseeable future actions are public documents prepared by Federal, State, and local government agencies.

5.2 Past, Present, and Reasonably Foreseeable Actions

The Arkansas NRCS manages the implementation of several programs that are focused on conserving and enhancing natural resources within the State. These programs are summarized in the following subsections to demonstrate the types of past, present, and reasonably foreseeable future actions that may occur in the ROI.

Conservation of Private Grazing Lands Initiative

The Conservation of Private Grazing Lands (CPGL) initiative provides technical and educational assistance to landowners who own private grazing lands. CPGL is not a cost share program and there are currently no funds appropriated for this program. Assistance includes opportunities for better grazing land management, reducing soil erosion, conserving water, and providing wildlife habitat (NRCS 2006a).

Environmental Quality Incentives Program

The Environmental Quality Incentives Program (EQIP) is a voluntary conservation program intended to promote agricultural production and environmental quality as compatible national goals. EQIP provides technical and financial assistance for farmers and ranchers to implement structural and management CPs on agricultural lands (NRCS 2006b). In Arkansas, EQIP assistance has helped address specific resource concerns such as water quality, irrigation water quantity decline, soil erosion, plant health, and wildlife habitat (NRCS 2006c). Arkansas received over $23.6 million in financial and technical assistance funding for fiscal year (FY) 2005 (NRCS 2006d).

Grassland Reserve Program

The Grassland Reserve Program (GRP) is a voluntary program that allows landowners to restore and protect grasslands on their property, while still maintaining these areas for grazing (NRCS 2006d). GRP emphasizes support for grazing operations, plant and animal biodiversity, and grasslands most

vulnerable to conversion to cropland, urban development, or other uses. Arkansas landowners were allocated $1.1 million for GRP in FY-2005 (NRCS 2006d).

Wetlands Reserve Program

WRP is a voluntary program that encourages farmers and ranchers to restore and protect wetlands. This program provides financial and technical assistance to landowners so they are able to restore agricultural land back to its former wetland condition. In Arkansas, WRP is focused on restoring bottomland forest ecosystems and improving water quality (NRCS 2006e). The State received $16.0 million in WRP funding for FY-2005 (NRCS 2006d).

Wildlife Habitat Incentives Program

The Wildlife Habitat Incentives Program (WHIP) is a cost-share program that assists landowners in creating high quality habitat to support wildlife populations of national, State, tribal, and local significance. NRCS and local conservation districts work with landowners to develop plans for establishing upland, wetland, riparian, or aquatic habitat areas on their properties (NRCS 2006d). In Arkansas, WHIP emphasis is on declining species such as the bobwhite quail, neo-tropical migratory songbirds, and several threatened or endangered species (NRCS 2006f). Arkansas was allocated over $1.5 million for this program in FY-2005 (NRCS 2006d).

5.3 Cumulative Effects Matrix

When considered in combination with other past, present, and reasonably foreseeable future actions, the incremental impact of the proposed action is expected to result in net beneficial impacts to biological resources, water resources, soil resources, air, recreation, and traffic and transportation conditions in the area proposed for CREP enrollment and in waters downstream (Table 5.1). No adverse cumulative impacts to any other resource discussed in Chapter 3.0 are expected.

Table 5.1 Cumulative effects matrix.

Resource	USDA Programs: CPGL EQIP, GRP, WRP, and WHIP	Cumulative Effects when combined with the Proposed Action
Biological Resources	The majority of these programs incorporate practices that provide restoration and enhancement of wildlife and fisheries habitat, vegetation, and water quality in their overall goals. These programs provide long-term beneficial impacts to biological resources.	The proposed action would enhance and restore wildlife and fisheries habitat, vegetation, and water quality within the ROI. When combined, the proposed action and USDA programs would result in cumulative impacts that benefit wildlife and fisheries, vegetation, and protected species.
Cultural Resources	There is potential for cultural resources to be impacted when these programs are initiated on previously undisturbed ground. ASHPO review of all proposed actions prior to implementation helps to ensure that cultural resources are protected and preserved. All actions would be reviewed with ASHPO during the planning and implementation phases of the proposed action.	The proposed action has the potential to impact cultural resources. Consultation with ASHPO would be conducted prior to implementation activities to ensure cultural resources are not adversely impacted. Because the proposed action and USDA programs both require ASHPO consultation, no cumulative impacts to cultural resources would be expected.
Water Resources	Several of these programs are designed to improve water resources by planting shrubs, trees, and grasses in riparian areas and on floodplains to reduce pollution	The proposed action would improve water quality in the ROI. The amount of pollutants and sediments entering waterways would be reduced by planting

Table 5.1 Continued

Resource	USDA Programs: CPGL EQIP, GRP, WRP, and WHIP	Cumulative Effects when combined with the Proposed Action
	runoff to surface water and to allow for greater rates of groundwater recharge. WRP specifically restores and enhances degraded wetlands. These programs contribute long-term beneficial impacts to water quality.	vegetation and restricting livestock access to floodplains. When combined, the proposed action and USDA programs would result in cumulative impacts that benefit water resources.
Soil Resources	The majority of these programs establish vegetation on erodible lands as a practice to achieve their overall goal. This increases soil stability and reduces erosion, and has a long-term beneficial impact to soil resources.	Implementation of the proposed action would involve planting permanent vegetation and restricting livestock access to floodplains, which would benefit local soil resources. When combined, the proposed action and USDA programs would result in cumulative impacts that benefit soil resources.
Air	The programs which restore and enhance vegetation and reduce local soil erosion may indirectly improve air quality.	The proposed action would reduce local soil erosion and may also improve air quality, although to what extent can not be quantified. When combined, the proposed action and USDA programs would result in cumulative impacts that benefit air quality.
Recreation	These programs are implemented on private lands, so benefits to areas used by the public for recreation are limited. However, there may be slight benefits to this resource in the form of improved wildlife and fisheries habitat, which may result in increased hunting, wildlife viewing, and fishing opportunities on nearby public lands. Improved aesthetics would also benefit recreation.	The proposed action would be implemented on private lands, but may also benefit wildlife and fisheries habitat and aesthetics on nearby public lands. When combined, the proposed action and USDA programs may result in cumulative impacts that benefit recreation.
Traffic and Transportation	The majority of these programs establish vegetation on erodible lands as a practice to achieve their overall goal. This increases soil stability and reduces erosion, and may provide a slight reduction in expenditures associated with transportation system maintenance due to erosion and sedimentation.	The proposed action would result in reduced erosion and sedimentation due to slower stream velocities and decreased overland flow. Highway and road system maintenance expenditures typically include costs associated with erosion and sedimentation. When combined, the proposed action and USDA programs may result in cumulative impacts that benefit existing traffic and transportation conditions.
Socioeconomics	The majority of these programs provide incentives focused on providing for more environmentally-sound farming and land use practices. The implementation of the conservation practices and expenditure of the incentives produce positive economic benefits, in addition to the economic benefits resulting from more environmentally-sound farming and land	The proposed action would provide incentives, rental payments, and maintenance fees which may offset some farm job losses. When combined with other USDA programs, the cumulative impact is expected to be negligible.

Table 5.1 Continued

Resource	USDA Programs: CPGL EQIP, GRP, WRP, and WHIP	Cumulative Effects when combined with the Proposed Action
	use practices.	
Environmental Justice	The majority of these programs provide incentives and/or education opportunities focused on providing for more environmentally-sound farming and land use practices. This would potentially produce new opportunities for local workers in pursuing job prospects that support more environmentally-sound farming and land use practices.	The proposed action would potentially provide new employment opportunities that support more environmentally-sound farming and land use practices. When combined with other USDA programs, the cumulative impact may be increased employment opportunities and a more stable work environment.

5.4 Irreversible and Irretrievable Commitment of Resources

As required by NEPA, any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented must be identified in environmental analyses. Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the effect that this use may have on future generations. Irreversible commitments are those that consume a specific resource that is renewable only over a long time period. Irretrievable commitments are those that consume a specific resource that is neither renewable nor recoverable for use by future generations. No irreversible or irretrievable resource commitments are expected from implementation of the proposed action.

6.0 MITIGATION MEASURES

6.1 Introduction

CEQ requires that all relevant reasonable mitigation measures that could improve a project should be identified, even if they are outside the jurisdiction of the lead agency or the cooperating agencies (40 CFR parts 1500 et seq., 2006). This serves to alert agencies or officials who can implement these extra measures, and to encourage them to do so. As this analysis is programmatic in nature and does not address exact locations, it is understood that detailed mitigation measures would be addressed on a site specific basis.

6.2 Roles and Responsibilities

As a part of the individual CREP contract approval process, consultation with the appropriate agencies would be conducted to reduce or eliminate potential impacts to resources identified in this PEA. For example, NRCS would provide technical expertise in the implementation of CPs. FWS would provide guidance to ensure that actions do not jeopardize or destroy protected species or their habitat. ASHPO would review actions to minimize potential impacts to cultural resources.

6.3 Mitigations

This chapter presents mitigation measures that would be used to avoid or lessen impacts to resources including biological, cultural, water, soil, and air.

Biological Resources

- Riparian buffers may require mowing to stimulate some vegetation growth. Mowing should take place before or after the nesting time for ground-nesting birds, which varies among species.

- If grassland nesting species are of concern to landowners participating in CREP, woody vegetation such as that common to riparian buffers or hardwood tree planting areas should not be planted directly adjacent to areas of current grassland or areas in which large tracts of native and introduced grasses and legumes are to be established.

- Disruption of areas that contain Missouri bladderpods may have a negative impact to this species. Care should be taken to ensure that areas containing populations of Missouri bladderpod are not enrolled into marginal pastureland wildlife habitat buffers.

- As riparian buffers mature, activities consistent with customary thinning or timber stand improvement may be necessary. Such activities may temporarily disrupt daily migration patterns of resident wildlife. The use of BMPs would help ensure these impacts would be minor and temporary.

- Some herbicides may be used during implementation of the CPs. Herbicides would be pre-approved by the governing Federal agency of the specific site and applied strictly according to label directions to minimize the threat to biological resources within the area.

Cultural Resources

- ASHPO and any other State, Federal, and tribal agencies with cultural resources oversight should be consulted as each individual CREP contract is developed and implemented. This would indicate if any cultural resources are known within the ROI or if additional field inventories would be necessary.

- FSA and ASHPO should communicate with any participating tribes to integrate planning with cultural resource protection and mitigation of adverse impacts, as well as soliciting input on the identification and protection of any TCPs.

Water Resources

- Installation of CPs may involve the clearing of vegetation and some soil disturbance. These activities may result in high levels of sediment runoff, resulting in temporary adverse impacts to surface water quality. The use of filter fencing or similar measures would reduce these impacts.

Soil Resources

- Short-term disturbances to soils during implementation of CPs may include tilling or installation of various structures such as fences, breakwaters, and roads. These activities may result in temporary increases in soil erosion. The use of silt fencing, filter fabric, or similar measures would reduce these impacts.

Air

- Implementation of the proposed CPs may include activities such as tilling and burning. This may temporarily increase particulate matter and other pollutants and adversely impact local air quality. Impacts would be minimized by measures such as watering exposed soil before and after tilling and burning in moderation and only in approved weather conditions.

- Installing various structures such as roads, firebreaks, and fences may require the temporary use of heavy-duty diesel construction vehicles. Primary emissions from construction vehicles include carbon monoxide and some particulate matter. BMPs would be used during construction activities to reduce the amount of emissions.

7.0 LIST OF PREPARERS

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Years Experience: 10

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8.0 PERSONS AND AGENCIES CONTACTED

Table 8.1 shows the Federal, State, and local agencies; American Indian tribes; and interest groups contacted for the CREP PEA.

Table 8.1 CREP PEA consultation.

Name	Title	Agency
Mark Sattelberg		FWS Formal Consult
Cathie Matthews		ASHPO Formal Consult
Anoatubby, Bill	Governor	Chickasaw Nation
Barbry, Earl, Sr.	Tribal Chairman	Tunica-Biloxi Tribe of Louisiana, Inc.
Berry, John	Tribal Chairman	Quapaw Tribe of Oklahoma
Blackmon, W.A.	President	Arkansas Cattlemen's Association
Butler, Bob	Regional Director	Arkansas Ducks Unlimited Field Station
Carruth, David	President	Arkansas Wildlife Federation
Devine, Marcus C.	Director	ADEQ
Edwards, James Lee	Governor	Absentee Shawnee Tribe
Ellis, A.D.	Principal Chief	Muscogee (Creek) Nation of Oklahoma
Emarthle, Alan	Cultural Preservation Officer	Seminole Nation of Oklahoma
Enyart, Charles	Chief	Eastern Shawnee Tribe of Oklahoma
French, Edgar L.	President	Delaware Nation
Gray, Jim	Principal Chief	Osage Nation
Greene, Richard	Regional Administrator	EPA Region 6
Haak, Bill	President	Benton County Farm Bureau
Hathaway, Randy	Planning, Environmental, and Regulatory Division	USACE, Little Rock District Office
Henderson, Scott	Chairman	AGFC
Hickie, Kevin	Washington County Forester	Arkansas Forestry Commission
Hooks, Glen	Associate Regional Representative	Sierra Club, Arkansas Chapter
Hornsby, Pete	President	Washington County Farm Bureau
Jackson, Mitchell	Crawford County Forester	Arkansas Forestry Commission
Jones, James	Crawford County Ranger	Arkansas Forestry Commission
Lawrence, Jeff	Senior Regional Director	Ducks Unlimited
Martin, Phillip	Chief	Mississippi Band of Choctaw Indians
McAdams, Gary	President	Witchita and Affiliated Tribes
Murray, Elizabeth	Coordinator	Arkansas Multi-Agency Wetland Planning Team Coordination Office
Ornesby, Wayne	Benton County Forester	Arkansas Forestry Commission

Table 8.1 Continued

Name	Title	Agency
Parker, LaRue	Chairperson	Caddo Nation
Pyle, Greg	Chief	Choctaw Nation of Oklahoma
Robertson, Gene	President	Crawford County Farm Bureau
Rodriguez Balandran, Olivia	Associate Director	EPA Region 6, Office of Environmental Justice and Tribal Affairs
Shannon, John T.	Director	Arkansas Forestry Commission
Shook, Doyle	President	The Wildlife Society, Arkansas Chapter
Simon, Scott	State Director	TNC of Arkansas
Smith, Chad	Principal Chief	Cherokee Nation of Oklahoma
Smith, Karen	Director	ANHC
Smith, Kenneth	Executive Director	Audubon Society Arkansas
Sparkman, Ron	Chairman	Shawnee Tribe of Oklahoma
Spears, Dennis	Washington County Ranger	Arkansas Forestry Commission
Stowe, George	Benton County Ranger	Arkansas Forestry Commission
Wickliffe, George	Chief	United Keetoowah Band of Cherokee Indians in Oklahoma
Young, J. Randy, P.E.	Executive Director	ANRC

9.0 GLOSSARY

Algae Bloom—Rapid and flourishing growth of algae in and on a body of water.

Aquifer—An underground formation capable of storing and yielding significant quantities of water; usually composed of sand, gravel, or permeable rock.

Candidate Species—A species of plant or animal being considered for listing by the FWS as threatened or endangered due to declining numbers in all or part of its range.

Community Type—A unique combination of plants and animals that occur in a particular location and are adapted to similar environmental conditions.

Conservation—The management of human and natural resources to provide maximum benefits over a sustained period of time. Conservation practices focus on conserving soil, water, energy, and biological resources.

Conservation Practice—Any technique or measure used to protect soil and water resources for which standards and specifications for installation, operation, or maintenance have been developed.

Cost Sharing—Payments to producers to cover a specified portion of the cost of installing, implementing, or maintaining a conservation practice.

Cropland—A land use/land cover category that includes five components: cropland harvested, crop failure, cultivated summer fallow, cropland used only for pasture, and idle cropland.

Dissolved Oxygen—Amount of free oxygen found in water; most commonly used measurement of water quality.

Ecosystem—A level of organization within the living world that includes both the total array of biological organisms present in a defined area and the chemical/physical factors that influence the plants and animals in it; all biological and non-biological variables within a defined area.

Edge Area—An area of change from one distinct ecosystem to another distinct ecosystem (e.g., forest to field).

Endangered Species—A species of plant or animal that is federally designated as threatened with extinction throughout all or a significant portion of its range.

Erosion—The removal and loss of soil by the action of water, ice, gravity, or wind.

Ethnicity—A person either of Hispanic or Latino origin and any race, or not of Hispanic or Latino origin and any race.

Extreme Poverty Area—An area in which at least 40 percent of the residents are below the poverty threshold.

Farm Income—The earnings of a farming operation over a given period of time, measured by several factors: 1) Gross cash income is the sum of all receipts from the sale of crops, livestock, and farm-related goods and services, as well as all forms of direct payments from the government. 2) Gross farm income is the same as gross cash income with the addition of non-money income, such as the value of home consumption of self-produced food and the imputed gross rental value of farm dwellings. 3) Net